

Compressor PLC	S1-10 Controller	ERAPOWER
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S1-10 Control Unit

Software Specification

“S1-10 Instruction Manual - EN”

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1.0 General Description

1.1 Controller Model Variants

The general default settings and tables shown in this specification are applicable to the standard production S1 controller model S1-20-3#0; functions available for alternative models can be set in configuration menus.

# = 5	for	KTY	temperature sensor (or RTD optional)
# = 6	for	PT100	temperature sensor
# = 7	for	PT1000	temperature sensor

- Temperature detection and setting limits may differ on models fitted with, and set for, alternative temperature sensor ACM types:

For example:	S1-10-350	KTY or RTD temperature sensor, no internal pressure detection
	S1-10-360	PT100 temperature sensor, no internal pressure detection
	S1-10-370	PT1000 temperature sensor, no internal pressure detection
	S1-10-353	KTY or RTD temperature sensor, with internal pressure detection
	S1-10-363	PT100 temperature sensor, with internal pressure detection
	S1-10-373	PT1000 temperature sensor, with internal pressure detection
	S1-20-350	KTY or RTD temperature sensor, no internal pressure detection
	S1-20-360	PT100 temperature sensor, no internal pressure detection
	S1-20-370	PT1000 temperature sensor, no internal pressure detection
	S1-20-353	KTY or RTD temperature sensor, with internal pressure detection
	S1-20-363	PT100 temperature sensor, with internal pressure detection
	S1-20-373	PT1000 temperature sensor, with internal pressure detection

The temperature sensor type must be set in the configuration menu if other than the type applicable to the software variant. All temperature sensor types are available in both software variants and are dependant on the type of ACM hardware fitted.

- Internal pressure detection, differential pressure detection and related functions will be unavailable on models that are not fitted with a secondary pressure sensor analogue input ACM.

Internal pressure detection must be enabled in the configuration menu for model types fitted with the secondary pressure detection ACM hardware.

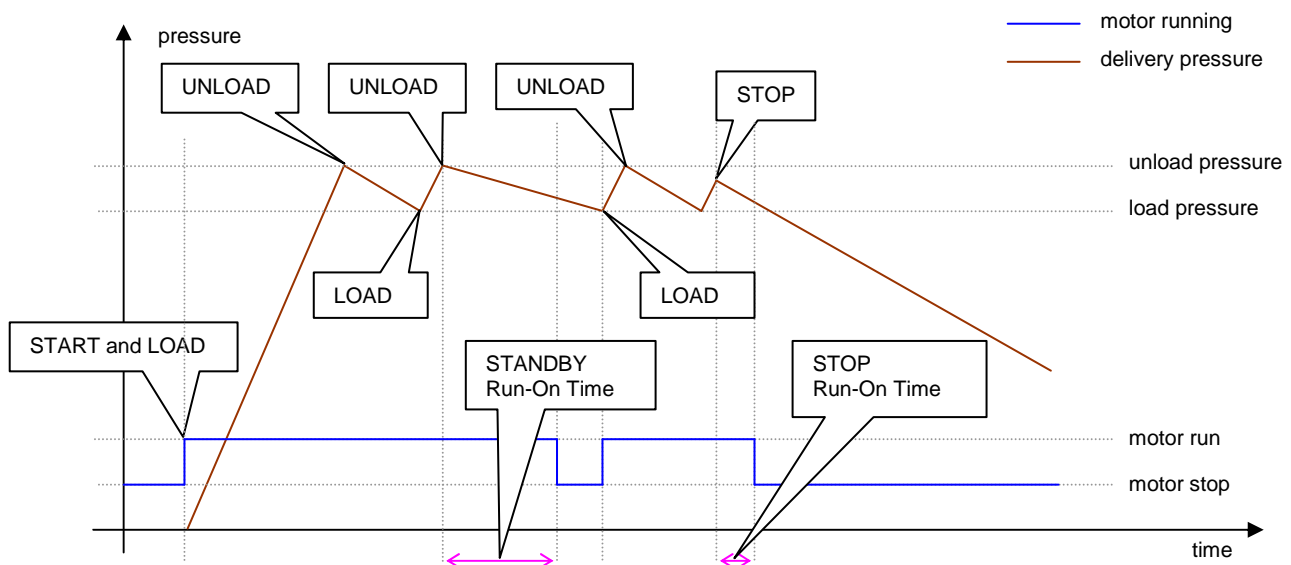
1.2 General Operation

In normal operation, the detected delivery pressure controls regulation of the compressor once the compressor has been started by pushing the start button, or by a remote start command if enabled. The controller will perform safety checks and start the compressor if no inhibiting conditions are detected.

If a start inhibiting condition exists the compressor will not enter the started condition and a start inhibit message is displayed. If a run inhibiting condition exists the compressor will enter the started condition but a main motor start is inhibited; the compressor will remain in the standby condition and a run inhibit message is displayed. If a load request is present, in accordance with internal pressure settings or by remote command, the main motor is started in a star/delta sequence. When running in delta configuration, after the star/delta time (adjustable) has expired, the load delay time (adjustable) prevents loading for a period to allow motor speed to stabilize. The load delay time can be set to one second if required. When the load delay time has expired the load valve output is energized and the compressor will load. If the unload pressure setting is reached, or a remote unload command is received, the load valve output is de-energized and the compressor will run offload for the standby run on time (adjustable) before the main motor stops and the compressor enters Standby mode. The compressor will load again if pressure falls below the load setting before the standby run on time expires. If in Standby mode, a motor start sequence followed by the load delay time is executed before loading.

In the event of a motor stop, initiated by a stop command or when entering standby mode, a blow down timer (adjustable) is started. If a start request is made during the blow down time the compressor will enter standby mode until the blow down time expires. If already in standby mode and a load request is present, the compressor will remain in standby mode until the blow down time has expired. For units with internal pressure detection enabled, a minimum internal re-start pressure can also be set to prevent a motor start sequence before internal pressure is vented. In the event internal pressure fails to fall below the set minimum re-start pressure within two minutes after the set blow down time has expired, a blow down fault is generated and the compressor will shutdown. After an unload event a re-load timer (adjustable) is initiated that will prevent re-loading, this time can be adjusted to a minimum of one second if required. Normal automated operation is ended by pushing the stop button, a remote stop command or in the event of a shutdown fault.

When stopped manually, or by a remote command, the load valve is de-energized and the main motor allowed to run-on for the stop run on time (adjustable). This time can be adjusted to a minimum of one second if required. Safety checks are made continuously, if there is a condition detected that presents a hazardous or damaging situation an immediate stop is performed and the reason displayed as a shutdown error message. If a warning condition is detected an Alarm message is displayed and normal operation continues.



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2.0 I/O Description

2.1 Digital Inputs

Connector X04:

Connector type: 9 pole mini Combicon with 3.81mm (0.15") pitch

Pin	name	function	id	active state
1	C+	Digital inputs common		
2	C1	Emergency stop	digital input 1	fault if open
3	C2	Oil filter	digital input 2	fault if open
4	C3	Air filter high DP	digital input 3	fault if closed
5	C4	Air/Oil separator DP	digital input 4	fault if open
6	C5	Remote start/stop *	digital input 5	stop if open/start on closure
7	C6	Remote load enable	digital input 6	remote if closed
8	C7	Remote load	digital input 7	load if closed, offload if open
9	C8	PTC motor overload	digital input 8	fault if open

* Digital Input 5:

The function of digital input 5

RSS = Remote Start/Stop

Open = Stop, Open to Closed transition = Start

Remote Stop:

When the remote start/stop function is enabled (P07), the compressor will execute a controlled stop, as if the control panel stop button had been pressed, when the remote start/stop input is open circuit.

Remote Start:

When the remote start/stop function is enabled (P07), the compressor will execute a normal start sequence when the remote start/stop input changes state from open to closed circuit. If closed, the remote start/stop input must be opened and closed again to initiate a remote start sequence. Local controller start is inhibited.

Remote load enable:

When the digital remote load enable input is activated, local or communications pressure regulation is ignored and the unit will respond to the digital remote load input. The unit will automatically respond to the pressure regulation method set in the configuration menu settings (local or communications) when the digital remote load enable is deactivated.

Remote load:

When the digital remote load enable is activated, the unit will load when the digital remote load input is activated and unload when the digital remote load input is deactivated. All pressure safety settings remain active when using remote load functions.

Note: If local detected delivery pressure exceeds the set Alarm level the load solenoid output is de-energized. The load solenoid output will remain de-energized for 10secs after the pressure falls below the Alarm level.

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2.2 Digital Outputs

Connector X03: relays

Connector type: 6 pole Combicon with 5mm pitch

Pin	name	function	id	active state
1	C-R123	common for star, delta and main contactor		
2	NO-R1	main contactor	digital output 1	energized
3	NO-R2	star contactor	digital output 2	energized
4	NO-R3	delta contactor	digital output 3	energized
5	C-R4	common for load solenoid		
6	R4	load solenoid	digital output 4	load when energized

Connector X02: additional relays (*S1-10+1R variant only*)

Connector type: 4 pole Combicon with 5mm pitch

Pin	name	function	id	active state
1	C-R5	common relay 5		
2	NO-R5	normal open contact relay 5	digital output 5	

The function of auxiliary relays 5 can be set in the configuration menu.

2.3 Analogue Inputs

Note: All analogue device inputs have open circuit, short circuit and out-of-range fault detection functions

Connector X05: Analogue inputs

Connector type: 6 pole mini Combicon with 3.81mm (0.15") pitch

Pin	name	function	id	type	Range
1	C-ANA1	delivery pressure +V common			
2	ANA1	delivery pressure input	analogue input 1	4-20 mA	Adjustable
3	C-ANA2	temperature 0Vcommon			
4	ANA2	temperature input (menu setting + ACM type)	analogue input 2	KTY or PT100, PT1000 or RTD	-10°C 132°C or -50°C 250°C or -40°C 150°C

Analogue Input 1: Fixed 4-20mA type

Analogue Input 2 : the S1 uses plug-in analogue conditioning modules (ACM's) that allow different sensor and signal types to be accommodated; for a particular sensor type the correct ACM hardware must be fitted.

3.0 Machine State Diagram

Controller operational logic is shown in the machine state diagram as state blocks with an associating status block number. The state block determines the functionality of the controller at any given time. The controller can only be in one state at any given time. The controller will move from state to state in accordance with the defined exit and entry conditions of each state block and the defined connections between state blocks.

Definitions:

Fault:

A detected abnormal condition that must be indicated to operator personnel and that may require controller automated safety action, dependant on fault type and definition.

Start Inhibit Fault (S):

A start inhibit fault is a condition that may present a danger or cause damage to the compressor if started whilst the condition is present. Start inhibit faults are only triggered if a compressor start from the ready to start condition is attempted. Start inhibit faults are not triggered during an automated motor start sequence from the standby condition. Start inhibit faults are self-resetting. A start inhibit fault code is displayed when triggered but is not recorded in the fault log.

Run Inhibit Fault (R):

A run inhibit fault is a condition that may present a danger or cause damage to the compressor if the main motor is started whilst the condition is present. Run inhibit faults are only triggered if a motor start sequence is initiated. Run inhibit faults are self-resetting and do not prevent the compressor from entering a started condition. A Run inhibit will hold the compressor in a standby state and will allow a motor start sequence when the condition is no longer present. A Run inhibit fault code is displayed when triggered but is not recorded in the fault log.

Alarm Fault (A):

An alarm fault is a warning condition that does not present an immediate danger or potential damage to the compressor. An alarm state will not shutdown the compressor or effect normal operation. An alarm fault code is displayed that must be manually reset to clear once the condition has been resolved or no longer exists.

Shutdown Fault (E):

A shutdown fault is a condition that may present danger or potential damage to the compressor if the condition persists. A shutdown fault will cause the controller to stop the compressor. A shutdown fault code is displayed that must be manually reset to clear once the condition has been resolved or no longer exists. Two types of shutdown fault are definable a) non-emergency shutdown, an immediate controlled stop is executed, b) emergency shutdown, and an instantaneous stop is executed.

Unload Pressure:

The unload pressure is the delivery pressure level (adjustable) at which the controller will de-energize the load solenoid output and the compressor will offload.

Load Pressure:

The load pressure is the delivery pressure level (adjustable) at which the compressor will energize the load solenoid output and the compressor will load. If in the standby state, an automated main motor start sequence is triggered prior to load.

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Main Motor Start Sequence:

The controller will energize the Star contactor output followed by the Main contactor output 200ms later. After the Star/Delta timer (adjustable) expires the controller will execute an automated Star to Delta contactor output changeover with a 50ms star to delta transition time. If a Stop command is received during the start sequence the controller will continue to execute the start sequence before stopping. This action is intended to limit the break current of motor starter contactors.

Load Delay Timer:

The star to delta output transition is immediately followed by a load delay time (adjustable) that will inhibit the load solenoid output from energizing until the load delay time expires. Intended to allow the main motor speed to stabilize and other pre-load functions to occur.

Reload Delay Timer:

The reload delay time (adjustable) is a period of time immediately following a load to unload event during which the load solenoid output is inhibited from energizing.

Blow Down Timer:

The blow down time (adjustable) immediately follows a main motor stop event. During the blow down time a start request is recognized but is not initiated until the timer expires. If the optional internal pressure detection feature is enabled the restart inhibit is also dependant on internal pressure falling below the 'start inhibit pressure level' (adjustable). Failure of internal pressure to fall below the set pressure level for a period of two minutes after the set blow down timer expires will result in a blow down trip fault. The remaining time in seconds is show on the Information Item display.

Standby Run-On-Time:

When off load the standby run-on-timer will start. If the compressor remains in an off load condition and the timer expires the main motor will stop and the compressor will enter the Standby state. The compressor will automatically re-start and load as required. This function is intended to improve efficiency during low demand periods and to limit the number, and interval between, motor start events. The remaining time in seconds is show on the Information Item display.

Stop Run-On-Time:

When stopped (stop button, remote stop input or remote stop command) the compressor will unload and the main motor continue to run for the stop run-on-time before stopping. This function is intended to allow for internal pressure venting and to limit lubrication oil aeration prior to the main motor stopping. The remaining time in seconds is show on the Information Item display.

Started State:

The unit has been started (start button, remote start input or remote start command) and is in an active condition ready to respond to changes in delivery pressure.

Running State:

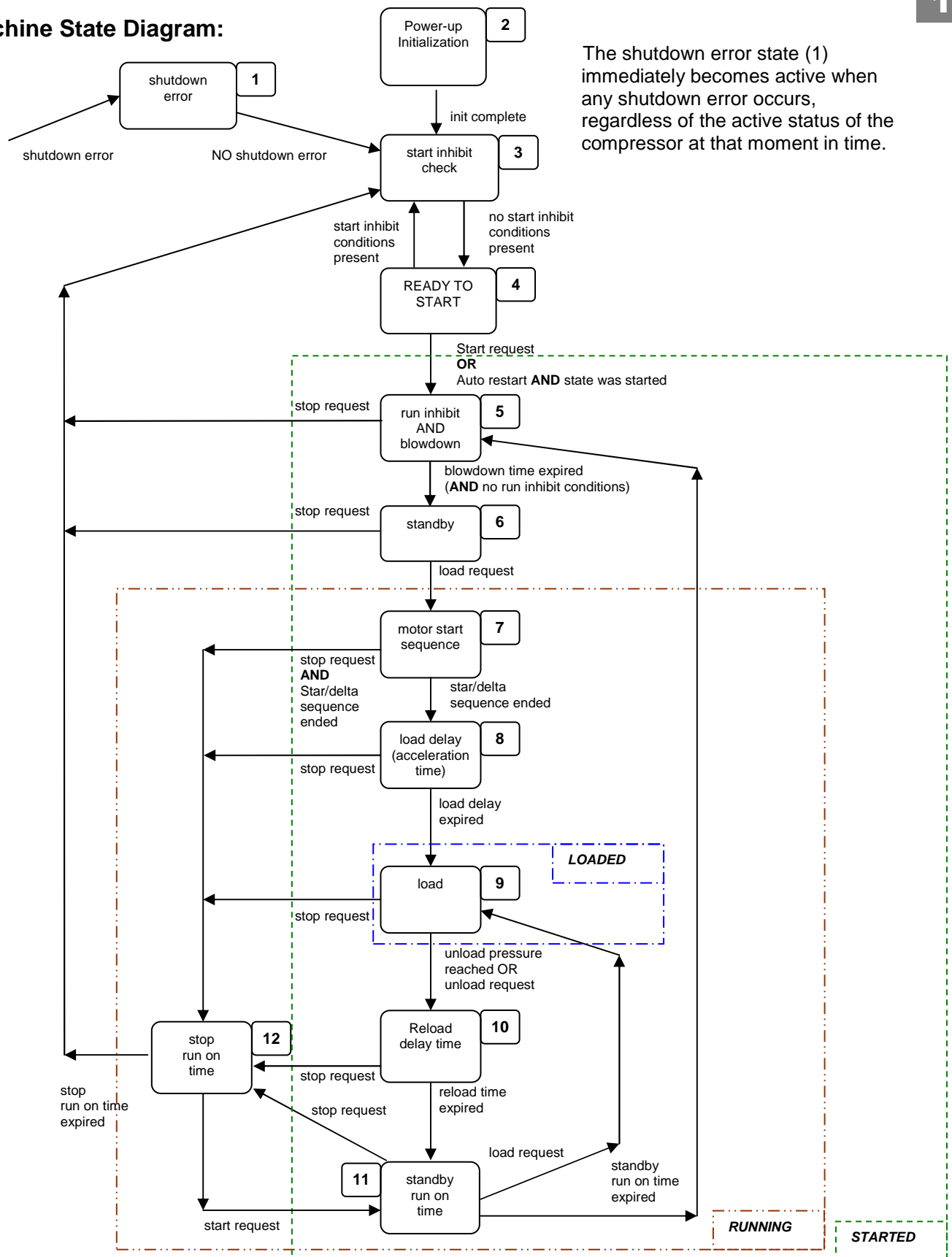
The unit is in the Started state AND the main motor is running.

Loaded State:

The unit is in the Started state AND running state AND the load solenoid output is energized.

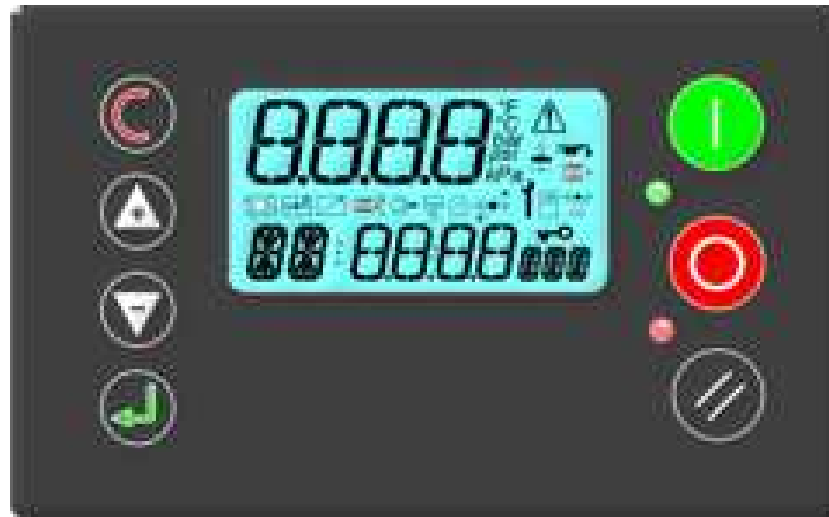
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Machine State Diagram:



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4.0 User Interface



Display : Custom backlit LCD
 Indicators : 2 x LED
 Controls : 7 x tactile push buttons

4.1 Keypad

START: Enter STARTED condition
 STOP: Exit STARTED condition
 RESET: Reset and clear fault conditions
 ENTER: Confirm selection or value adjustments
 MINUS/DOWN: Scroll down through menu, menu item options or decrement value
 PLUS/UP: Scroll up through menu, menu item options or increment value
 ESCAPE (C): Step back one menu navigation level

Start and Stop have one defined function and are not used for any other purpose.

Reset will initiate a display jump to the fault code item if a fault condition remains active or initiate a display jump to the information item if no active faults exist in normal display mode. If pressed and held for longer than two seconds in menu mode will exit menu mode to the normal operational display mode, page 00.

Enter will lock a selected value display preventing return, after a short delay, to the default Td value display. When locked the 'key' symbol will flash. To unlock press Escape.

Escape will initiate a display jump to the information item in normal display mode, page 00.

Plus, Minus, Enter and Escape are used to navigate menu mode and adjust menu parameters.



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4.2 Led Indicators

STATUS : Green, adjacent to Start and Stop buttons
 FAULT : Red, adjacent to Stop and Reset buttons

Indicator States:

ON : Illuminated continuously.
 FF : Fast Flash: on/off four times per second.
 SF : Slow Flash: on/off once per second.
 IF : Intermittent Flash: on/off every four seconds.
 OFF : Extinguished continuously.











Machine State Number	Machine State	Status 	Fault 
1	Shutdown Error	OFF	FF
2	Startup Init	OFF	OFF **
3	Start Inhibit Check	OFF	OFF **
	Start inhibit condition		SF
4	Ready to Start	OFF	OFF **
5	Blowdown	if (load_request) FF else IF	OFF **
6	Standby	IF	OFF **
7	Start Motor in Star/Delta	if (load_request) FF else IF	OFF **
8	Load Delay	if (load_request) FF else IF	OFF **
9	Load	ON	OFF **
10	Reload Delay	if (load_request) FF else IF	OFF **
11	Standby Run on Time	IF	OFF **
12	Stop Run on Time	SF	OFF **

 ** SF for Alarm condition











Display Character Examples, Units:

BAR	bar	KPA	kPa	CFM	cfm	CFM	cfm
PSI	psi	Hh	hour	M3m	m³/min	m3	m³ cubic metres
KW	kW KiloWatt	Mm	minute	FT3	ft³ cubic feet	h/m	time hours/minutes
KV	kV KiloVolt	S	seconds	SPM	spm bearing monitoring	dmY	date day/month/year
RPM	rpm	mA	mA milliAmp	dBm	dBn spm unit	()	greater than less than
OC	°C	mV	mV milliVolt	+	+ positive	^ v	up down
O/O	% percent	OF	°F	-	- negative	/ \	star delta

Operational Display Symbols:

	Motor Running
	Loaded
	Amount of time, timer
	Filter, differential pressure
	Pressure set point indication (upper and lower set point indicators displayed independently)
	Condensate drain active (optional function)
	Power failure auto restart enabled (optional function)
	Remote load or remote pressure regulation active
	Remote start/stop
	Normal Operational: selected item locked as temporary default display Menu Mode: page item locked (adjustment inhibited)

Fault Display Symbols:

	General fault		Lubrication, oil, oil level
	Emergency stop		Dew point
	Excess pressure		Motor
	Power failure		Service due, maintenance
	Above set temperature limit		Filter differential, filter service

4.4 Display Structure and Menu Navigation

Display Item Structure:

All value, parameter or option selection displays are grouped into menu lists. Items are assigned to a list according to type and classification. Items that can be used to select options or modify functions are assigned to 'menu mode' lists. Items that an operator may require to view during routine operation, detected pressure or temperature values for example, are assigned to the normal operational mode list. Lists are identified by page number; the normal operational display list is page 0. All parameters and options are assigned to menu mode pages 1 or higher. All Page 0 items are view only and cannot be adjusted.

Normal Operational Mode (Page 0):

At controller initialization, all display elements and LED indicators are switched on for three seconds, the display will then show the software version code for a further 3 seconds before initialization is complete and the normal operating display (Page 0) is shown. In page 0 'normal operational display mode' the Display Field will show the final delivery pressure continuously and the Item and Value Fields will initially show the Information Item display for 35 seconds before reverting to the default temperature display item. All available Item and Value field option displays (temperatures, pressures, hours counters) can be selected using the Up or Down buttons at any time. The Item display will revert to the default item after 35 seconds if no further selection is made. Pressing the Enter button will lock any selected Item display and inhibit return to the default display. When an Item display is locked the lock key symbol will slow flash. To unlock an Item display press Up or Down to view an alternative Item display or press Reset or Escape. In page 0 Escape will select the Status Information Item display and Reset will select any active fault code display or the Status Information Item display if no faults are active. Unless a selected Item display is locked, the display will automatically jump to the Status Information Item display at key status change events. The timeout period before returning to the default Item display is modified in some instances to enable the full range of a set countdown timer to be shown. No Item values, options or parameters can be adjusted in page 0. If a fault condition occurs the fault code becomes the first list item and the display will automatically jump to display the fault code. More than one active fault code item can exist at any one time.

Access Code:

Access to page list displays higher than page 0 are restricted by access code. To access menu mode pages press UP and DOWN together, an access code entry display is shown and the first code character will flash. Use PLUS or MINUS to adjust the value of the first code character then press ENTER. The next code character will flash; use UP or DOWN to adjust then press ENTER. Repeat for all four code characters. If the code number is less than 1000 then the first code character will be 0(zero). To return to a previous code character press ESCAPE. When all four code characters have been set to an authorized code number press ENTER. Access to certain menu mode pages is dependent on authority level determined by the access code used. An invalid code will return the display to normal operational mode; page 0.

CD: 0000

The following pages and access levels are used:

ACCESS LEVEL = USER (code = 0009)	ACCESS LEVEL = SERVICE 1 (code = 0100)	ACCESS LEVEL = SERVICE 2 (code = 0121)
P00, P01, P02	P00, P01, P02, P03 P04, P05, P06, P07 P09	P00, P01, P02, P03 P04, P05, P06, P07 P09, P10

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Access Code Timeouts:

When in menu mode, if no key activity is detected for a period of time the display will automatically reset to the normal operational display; Page 0. The timeout period is dependant on the access code used:

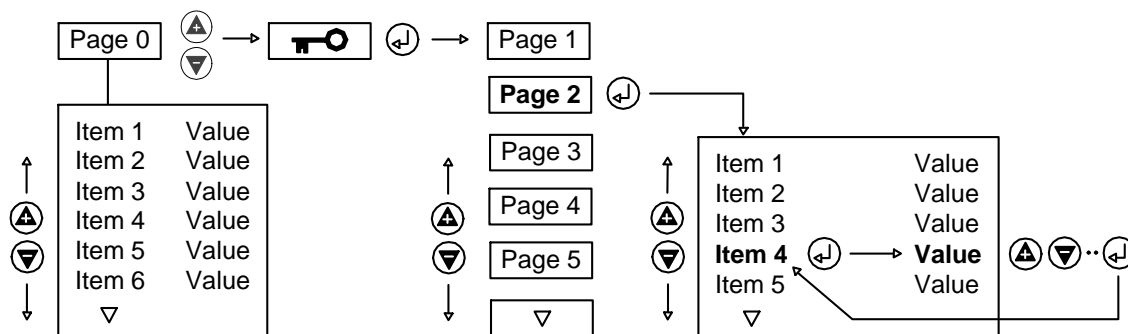
User: 1 minute

Service 1: 10 minutes

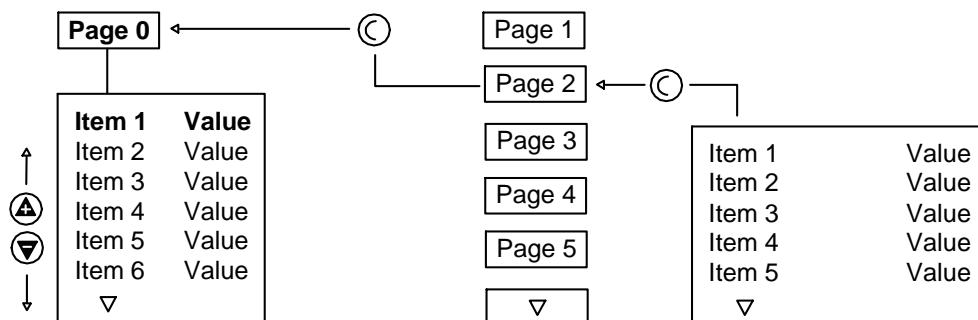
Service 2: 1 hour


Menu Mode Navigation:


In menu mode the Display Field will flash and show the Page number. To select a page press UP or DOWN. For each page the Item and Value field will display the first Item of the page list. To view a page list press ENTER, the Page number will stop flashing and the Item display will flash. Press UP or DOWN to view the selected page list items. To select an Item values for modification press ENTER, the Item display will stop flashing and the Value display will flash. The value or option can now be modified by pressing UP (Plus) or DOWN (Minus). To enter a modified value or options in memory press ENTER; alternatively the modification can be abandoned, and the original setting maintained, by pressing ESCAPE.



Press ESCAPE at any time in menu mode to step backwards one stage in the navigation process. Pressing ESCAPE when the page number is flashing will exit menu mode and return the display to normal operational mode; page 0.

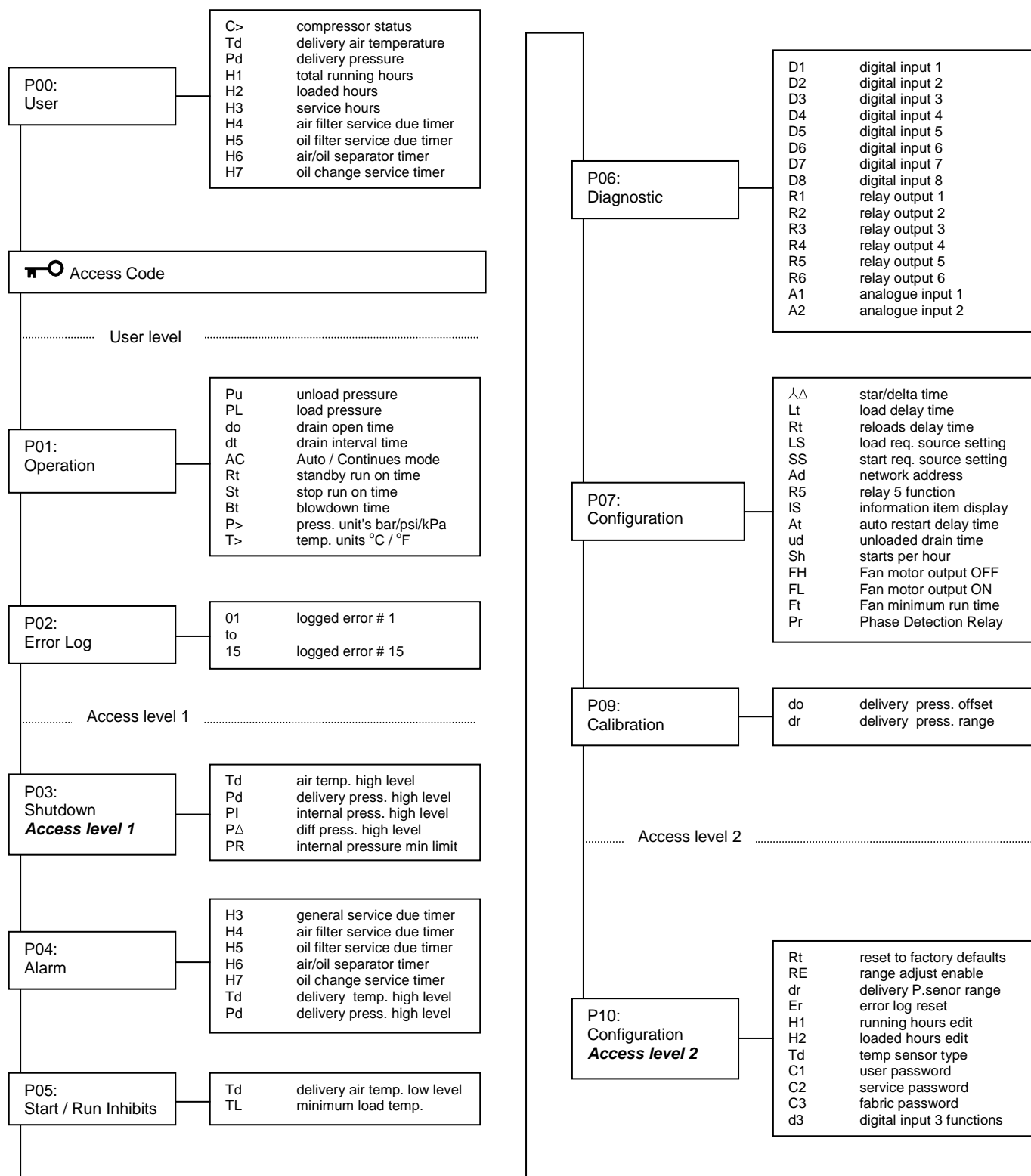


 Press and hold RESET for two seconds at any time to immediately exit menu mode and return to the normal operational mode display. Any value or option adjustment that has not been confirmed and entered into memory will be abandoned and the original setting maintained.

 A flashing Key symbol displayed with any Item indicates the Item is locked and cannot be modified. This will occur if the Item is view only (non adjustable) or in instances where the item cannot be adjusted while the compressor is in the operational STARTED state.

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4.4.1 Menu Structure



4.4.2 P00 User Menu

The User menu shows normal operational values and information displays. This is the default display menu; no access code is required.

item#	description	units	step	min	max	default	display
1	information screen	---	no_edit	---	---	---	C>
2	delivery air temperature	°C/°F	no_edit	---	---	-- -	Td 55 °C
3	delivery pressure	bar/psi	no_edit	---	---	---	Pd 4.5 bar
4	running hours	h	no_edit	0	99999	---	H1 1430 h
5	loaded hours	h	no_edit	0	99999	---	H2 1275 h
6	general service hours	h	no_edit	-2000	99999	---	H3 570 h
7	air filter service hours	h	no_edit	-2000	99999	2000	H4 570 h
8	oil filter service hours	h	no_edit	-2000	99999	4000	H5 2570 h
9	separator service hours	h	no_edit	-2000	99999	4000	H6 2570 h
10	oil change service hours	h	no_edit	-2000	99999	4000	H7 2570 h

Status Information Item:

The page 0 'Status Information Item' provides a basic overview of status using symbols:



Main motor running



Compressor on load



Delivery pressure relative to pressure set points, not displayed when remote pressure control active.



Pressure equal to, or below, load pressure set point



Pressure equal to, or above, unload pressure set point



Pressure between load and unload pressure set points



Condensate drain valve output is energized (if function enabled)



Countdown timer function is occurring (Run-On-Time, Stop Run-On-Time, and Blowdown Time). During a countdown time function the remaining time in seconds is displayed.

Unless a timer function is active and the timer count is being displayed, the 'units' display field will show the selected Information item, see P07 'In' menu item.

Hours Display Items:

Hours are displayed using the 'value and units' display fields together. This feature enables a maximum of 9999999 hours to be displayed.

H2: 123456

(Loaded Hours 'H2' = 123456 h)

Note: hour values less than 1000 are shown with leading zeros (10 hours = 0010)

4.4.3 P01 Operation Menu

Contains general operation parameters that may be modified by the user from time to time.

item#	description	units	step	min	max	default	display
1	unload pressure	bar/psi	0.1	PL+0.2	14.0	7.0	Pu 7.0 bar
2	load pressure	bar/psi	0.1	5.0	Pu-0.2	6.5	PL 6.5 bar
3	drain open time	s	1	1	30	5	do 5 s
4	drain interval time	s	1	30	3600	60	dt 60 s
5	op. mode selection	---	---	Auto	Cont	Auto	AC Auto
6	standby run on time	s	1	1	3600	300	Rt 300 s
7	stop run on time	s	1	1	60	30	St 30 s
8	blowdown time	s	1	1	600	10	Bt 10 s
9	pressure units	---	1	0	2	0	P> 0 0= bar / 1=psi / 2=kPA
10	temperature units	---	1	0	1	0	T> 0 0= °C / 1= °F

Minimum differential between load and unload set points is 0.2bar

Pressure Settings:

Trip cannot be adjusted above maximum sensor range

Alarm can not be adjusted above (Shutdown – 0.2bar) or below ('Pu' Unload + 0.2bar)
 Unload can not be adjusted above (Alarm – 0.2bar) or below ('PL' Load + 0.2bar)
 Load cannot be adjusted above ('Pu' Unload – 0.2bar) or below 5.0bar

Pressure and Temperature Units:

Selects the units for displayed values. Internally the controller operates using mBar (0.001bar) and mCelsius (0.001°C). The values displayed are calculated from the internal operating values.

Operating Mode:

Auto Mode: motor run-on timer enabled.

Cont Mode: motor run-on timer inhibited, compressor will continue to run offload indefinitely.

4.4.4 P02 Error Log Menu

Contains the last 15 fault states in chronological order. The most recent fault (alarm, start inhibit or shutdown) is stored as item 01. Each item consists of two values: the fault code number and the running hours when the fault occurred. The display will automatically alternate between these two values. All items are view only.

item#	description	units	step	min	max	default	display
1	logged error #1	---	no_edit	---	---	---	01 ... Er: 0010 E <> 12345 *
2	logged error #2	---	no_edit	---	---	---	02 ... Er: 0080 E <> 12344 **
3	logged error #3	---	no_edit	---	---	---	03
4	logged error #4	---	no_edit	---	---	---	04
5	logged error #5	---	no_edit	---	---	---	05
6	logged error #6	---	no_edit	---	---	---	06
7	logged error #7	---	no_edit	---	---	---	07
8	logged error #8	---	no_edit	---	---	---	08
9	logged error #9	---	no_edit	---	---	---	09
10	logged error #10	---	no_edit	---	---	---	10
11	logged error #11	---	no_edit	---	---	---	11
12	logged error #12	---	no_edit	---	---	---	12
13	logged error #13	---	no_edit	---	---	---	13
14	logged error #14	---	no_edit	---	---	---	14
15	logged error #15	---	no_edit	---	---	---	15 ... Er: 0010 E <> 10123 ***

Example:

* 01 last detected error

Emergency Stop shutdown (fault code 0010E) at 12345 running hours

** 02 detected error

Motor Stop shutdown (fault code 0080E) at 12344 running hours

.....
.....
.....
.....

*** 01 first detected error

Emergency Stop shutdown (fault code 0010E) at 10123 running hours

4.4.5 P03 Shutdown Menu

Settings that determine the level or condition at which a shutdown fault is generated.

item#	description	units	step	min	max	default	display
1	delivery air temperature high level	°C /°F	1	80	130 **	120	Td 120 °C
2	delivery pressure high level	bar/psi	0.1	7.0	16.0	8.0	Pd 8.0 bar

4.4.6 P04 Alarm Menu

Settings that determine the level or condition at which an alarm fault is generated.

item#	description	units	step	min	max	default	display
1	general service timer	hours	1	-2000	99999	2000	H3 2000
2	air filter timer	hours	1	-2000	99999	2000	H4 2000
3	oil filter timer	hours	1	-2000	99999	4000	H5 4000
4	air/oil separator timer	hours	1	-2000	99999	4000	H6 4000
5	oil timer	hours	1	-2000	99999	4000	H7 4000
6	delivery air temperature high level	°C /°F	1	70	120	110	Td 110 °C
7	delivery pressure high level	bar/psi	0.1	7.0	15.9	7.6	Pd 7.6 bar

Service Countdown Timers:

The service countdown timers will count down from the set value in accordance with running hours. When the item is viewed the service hour's value will reflect the current hours remaining until a routine maintenance service is due (zero hours). When zero hours are reached a service due alarm will be displayed. The alarm can only be reset when the service hours is adjusted above zero. The service hour's count will continue to count down in negative values until the timer is re-set. This function is intended to promote timely routine maintenance and indicate how many running hours have passed since a service due alarm was displayed. The value can be adjusted back to the required maintenance interval time each time a maintenance service is completed.

4.4.7 P05 Load and Run Inhibit Menu

Settings that determine the level or condition at which a start or Run inhibit condition exists.

item#	description	units	step	min	max	default	display
1	delivery air temperature low level	°C / °F	1	-20	10	1	Td 1.0 °C
2	load inhibit temperature	°C / °F	1	0	70	0	TL 0.0 °C

Delivery Air Temperature Low Level :Run Inhibit active if temperature falls below set limit.

Internal Pressure Start Level :Run Inhibit active if pressure is above set limit.

Load Inhibit Function:

Td temperature checked in state block 8 (after motor start sequence and load delay time).

If Td temperature below set TL 'Load Temperature' controller will display Er: 3423 L (load inhibit) warning and hold in offload state. Automatically reset, and compressor will load, when temperature exceeds the set TL temperature limit; cannot be manually reset.

0 = OFF, no function

1 to 70 °C = minimum Td temperature before load

4.4.8 P06 Diagnostic Menu

This menu allows a technician to check all inputs and test all outputs individually without running the compressor.

item#	description	units	step	min	max	default	display
1	digital input 1	---	no_edit	---	---	---	D1 0 _ _ _
2	digital input 2	---	no_edit	---	---	---	D2 0 _ _ _
3	digital input 3	---	no_edit	---	---	---	D3 1 _ / _
4	digital input 4	---	no_edit	---	---	---	D4 0 _ _ _
5	digital input 5	---	no_edit	---	---	---	D5 1 _ / _
6	digital input 6	---	no_edit	---	---	---	D6 1 _ / _
7	digital input 7	---	no_edit	---	---	---	D7 1 _ / _
8	digital input 8	---	no_edit	---	---	---	D8 0 _ _ _
9	relay output 1	---	1	0	1	0	R1 1 _ / _
10	relay output 2	---	1	0	1	0	R2 1 _ / _
11	relay output 3	---	1	0	1	0	R3 1 _ / _
12	relay output 4	---	1	0	1	0	R4 1 _ / _
13	relay output 5	---	1	0	1	0	R5 1 _ / _
14	analogue input 1	---	no_edit	---	---	---	A1 4.00 mA
15	analogue input 2	---	no_edit	---	---	---	A2 0.467 V

Digital Inputs:

The display will indicate the actual state of the input “_ / _” (open circuit) or “_ _ _” (closed circuit) and the status of the corresponding input function; active (1) or de-active (0).

Note: Value display number indicates function not input state (example: Emergency Stop = 0 “_ _ _” the input is closed circuit and the Emergency Stop function is not active).

Relay Outputs:

Relays can be energized (1) and de-energized (0). The motor starter relay outputs, 1 to 3, can only be energized one at a time, the output will de-energize when the selected Item is changed.

Analogue Inputs:

Analogue input values will toggle (2 second) between associated engineering units set for the input and the actual mV(temperature or voltage inputs) or mA(current loop inputs) detected on the controller connector of the corresponding analogue input. The mV or mA value can be independently checked with a meter.

4.4.9 P07 Configuration Menu

Settings that determine the basic operating configuration.

item#	description	units	step	min	max	default	display
1	star/delta time	s	0.2	1	30	10	Δ 10.0 sec
2	load delay time	s	0.2	1	30	1	Lt 1.0 sec
3	reload delay time	s	0.2	1	10	1	Rt 1.0 sec
4	load request source setting	0=press. sensor 1=comm. req.	1	0	1	0	LS 0
5	start request source setting	0=keyboard 1=comm. req. 2=dig. inputs	1	0	2	0	SS 0
6	network address	---	1	1	99	1	Ad 1
7	relay 5 function setting	1 to 13 see Output Functions	1	1	13	13	R5 13

Relay 5 Output Functions:

- | | |
|---------------------|--|
| 01 – Alarm | De-energized for any active Alarm fault (not including Start/Run Inhibit) |
| 02 – Shutdown | De-energized for any active Shutdown fault (not including Start/Run Inhibit) |
| 03 – Group Fault | De-energized for any active Alarm, Star/Run Inhibit or Shutdown fault |
| 04 – Alarm Service | De-Energized for any Alarm fault or Service Due alarm (not including Start/Run Inhibit) |
| 05 – Service | Energized for Service Due alarm only |
| 06 – Heater | Energizes if detected temperature falls below set low temperature run inhibit + 2°C
De-energizes if detected temperature increases above set low temp run inhibit + 3°C
Can be used to energize anti-condensate heater contactor or as low temperature warning auxiliary output. |
| 07 – Drain | - When loaded: cycle in accordance with drain open and drain interval time settings.
Elapsed interval time is stored in non-permanent memory when not loaded and the remaining interval time applied when loaded operation is resumed.
- When not loaded AND in 'started' state (optional; active only if offload drain time set above zero seconds, 0sec = offload drain function disabled).
drain interval time = drain interval time x 10.
drain open time = offload drain time setting.
reset to start of interval time when status change to not loaded, then cycle. |
| 08 – Fan | Energized in all RUNNING states except 'motor start' and 'load delay time'
Can be used to energize internal and/or external cooling fan motor contactor |
| 09 – Standby | Energized in 'Standby' and 'Blowdown' states |
| 10 – Running | Energized in all RUNNING state conditions |
| 11 – Loaded | Energized in all LOADED state conditions |
| 12 – Started | Energized in all STARTED state conditions |
| 13 – Fan (temp ctl) | Enabled to operate in all RUNNING states except 'motor start' and 'load delay time'
If enabled to operate the output will only energize if delivery temperature exceeds the set 'Fan High' temperature setting. If delivery temperature falls below the set 'Fan Low' temperature setting the output will de-energize. Once energized the output will remain energized for a minimum of the set 'Fan Minimum Run Time' regardless of delivery temperature. Can be used to energize internal and/or external cooling fan motor contactor; the minimum run time is intended as a means of limiting Fan motor starts-per-hour. |

item#	description	units	step	min	max	default	display
8	indication field function setting	0=no indication 1=network address 2=machine state No. 3=average cycle time 4=max cycle time 5=# starts registered	1	0	5	1	IS 1
9	auto restart delay time	s	1	0	120	10	At 10.0 sec
10	offload drain time	s	1	0	30	0	ud 0
11	starts per hour	---	1	0	20	0	Sh 0
12	fan control OFF temp	⁰ C					FH 85 ⁰ C
13	fan control ON temp	⁰ C					FL 75 ⁰ C
14	fan minimum run time	s					Ft 180 sec
15	phase detection relay function	---	---	0	d4	0	Pr d4

Start Request Source:

Digital Input Start/Stop (selection 2) only available when item 'DO' set for Remote Start Stop (RSS)

Indication Field Function Setting:

The function of the number shown in the 'units' display field (bottom right of display) when the 'Status Information Item' is selected from the normal operational menu P00:

- Network Address – the set RS485 network address for the compressor (default)
- Machine State Number – the current active status block condition (see machine state diagram)
- Average Cycle Time – the average controller software cycle time in mSecs
- Maximum Cycle Time – the maximum controller software cycle time in mSec
- Starts Registered – The number of motor start events that have occurred in the last one-hour period

Information field items are intended for general information or diagnostic purposes, to disable select (0).

Auto Restart Delay:

If an auto restart delay time is specified, the controller will execute an automated restart after a power disruption if the controller was in the Started state when the power disruption occurred. The delay time specifies the warning period after controller initialization before a re-start is executed. The time before restart is indicated on the controller display. No restart will occur if the controller was not in the started state prior to power disruption.

Starts per hour:

Every time a main motor start event occurs, an entry is made in an array (app_starts_per_hour_countdown_array[x]). The entry is made in the first available location in a FIFO register list. The entry is 3600 seconds, which is counted down from that point in time. For every motor start event to the maximum number of starts per hour allowed, an entry is made. When the first entry expires, the others, which were recorded at a later point in time, will be shifted forward one, and the number of registered motor starts is decremented. If the number of motor starts registered (motor start events within the last one hour period) equals the number of starts allowed, an adjustment to the run-on-time is made. The new run-on-time is calculated so that the compressor will continue to run offload until the number of registered start events within the last one hour period reduces below the maximum number set, allowing another start event to occur.



The 'starts per hour' function only influences the standby run on time, it will not prevent the motor from being starting. If a new start is performed after the maximum number of starts has already been registered, the oldest one is removed from the list, which causes the time to wait to increase.

To disable the function, and maintain the set run-on-time period regardless of motor start events, adjust the starts per hour setting to 0(zero).

Phase Detection Relay Function : (PDR) Phase Detection Relay

The function of Phase detection relay is selectable (menu P07 Item 18)




0= Closed

d2=> Oil filter high DP  **d4=> Oil-Air Separator filter high DP** 

d2= Phase Detection Relay

Closed = OK, Open = Emergency stop; E:0020  
Digital input 2=> Phase Detection Relay 
Digital input 4=> Oil-Air Separator filter high DP.....

d4= Phase Detection Relay

Closed = OK, Open = Emergency stop; E:0040  
Digital input 2=> Oil filter high DP..... 
Digital input 4=> Phase Detection Relay

4.4.10 P09 Calibration Menu

Pressure sensor calibration settings.

Calibration settings for analogue pressure sensors.

When an item is selected the page# display field will show the actual pressure for the item select using the existing calibration values. As calibration values are adjusted the pressure display will reflect the new calibration.

Offset: To calibrate an offset, expose the appropriate sensor to atmosphere and adjust the offset value until the pressure display shows 0.0bar.

Range: To calibrate the range, apply an accurately known pressure to the sensor and adjust the range value until the pressure display matches the applied pressure. The range value can be calibrated with static or changing applied pressure.

item#	description	units	step	min	max	default	display
1	delivery pressure offset	bar/psi	0.1	-0.5 bar	0.5 bar	0.0	do 0.0 bar
2	delivery pressure range	bar/psi	0.1	-10% range	+10% range	16.0	dr 16.0 bar

Caution: Incorrectly set pressure sensor calibration values will affect performance and pressure related safety functions.

4.4.11 P10 Access Level 2 Configuration Menu

Special functions and settings that determine specific configuration; generally set once during commissioning.

item#	description	units	step	min	max	default	display
1	reset to factory defaults	---	---	---	---	---	Rt dFLt 7.0 bar
2	enable p. sensors range adjusts.	---	1	0	1	0	RE 0
3	delivery p. sensor range	bar/psi	0.1	5.0	100.0	16.0	dr 16.0 bar
4	error log reset	---	---	rst=0	reset	---	Er 0
5	running hours edit	hours	100	0	99999	0	H1 0 hour
6	loaded hours edit	hours	100	0	99999	0	H2 0 hour
7	delivery air temperature sensor type	2=PT100/PT1000 3=KTY 4=RTD	1	2	4	3**	Td 3
8	user password	---	1	0001	9999	0009	C1 0009
9	service password	---	1	0001	9999	0100	C2 0100
10	fabric password	---	1	0001	9999	0121	C3 0121
11	d3 digital input functions	---	1	NO	NC	NO	d3 NO

** set to 3 as default on software variant; may be set differently in other standard software variant derivatives.



Reset To Factory Defaults

Caution: This function will reset all adjustable settings and configuration parameters to factory default (see Factory Default Configuration and Pressure tables).

Enable Pressure Sensor Range Adjustment:

If set to 1=ON will allow the range values for the delivery and internal pressure sensors to be adjusted. Range adjustment provides a means of modifying the controller to accept 4-20mA pressure sensors that have range values different to the standard 0 to 16.0 bar default. If set to 1=ON and a 'Reset to Factory Default' is executed the pressure sensor ranges are not reset and will remain as adjusted.

Pressure Sensor Range Adjustments:

The pressure sensor range values must match the range of the pressure sensor used. If a 4-20mA sensor with a range of 0 to 20bar is connected to the delivery pressure analogue input adjust the delivery pressure sensor range value to 20.0bar.



Incorrect adjustment of pressure sensor range values will affect accuracy, performance and pressure related safety functions.

Error log reset:

Error log reset is used to clear all entries in the error log list (menu page 02).

To clear the error log list select the error log reset item then press UP(plus); the value display will show "RST". Press ENTER, when the error log is clear the value display will change back to "0".

Running and Loaded Hours Edit:

Note: The recorded hour's values can be adjusted using these items.

Delivery Air Temperature Sensor Type:

The appropriate hardware ACM module must be fitted to the S1 before a selection change is made.

Sensor Type	Setting	ACM
KTY	2	KTY
PT100	3	PT100
PT1000	3	PT1000
RTD	4	KTY

Passwords:

Passwords can be change only with fabric password level.

C1	→	USER	Password	default value=0009
C2	→	SERVICE	Password	default value=0100
C3	→	FABRIC	Password	default value=0121

ATTENTION !!!

If any reason passwords is forgotten PLC must be return source.

d3 DIGITAL Input Function:

Digital input function can be selectable. Default value NO. Can be set for different sensor NC.

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4.4.12 Reset To Defaults - CONFIGURATION TABLE

Factory Defaults				
No.	Item	Description	Value	Unit
P01				
1	do	Drain Open Time	5	sec
2	dt	Drain Interval Time	60	sec
3	Rt	Standby Run-On Time	300	sec
4	St	Stop Run-On Time	30	sec
5	Bt	Blowdown Time	10	sec
6	T>	Temperature Display Unit	0 = °C	
P03				
7	Td	Delivery Temperature Shutdown	120	°C
P04				
8	SD	Service Timer	2000	hours
9	Td	Delivery Temperature Alarm	110	°C
P05				
10	Td	Delivery Temperature Run Inhibit	1	°C
P07				
11	△	Star/Delta Time	10.0	sec
12	Lt	Load Delay Time	1.0	sec
13	Rt	Reload Delay Time	1.0	sec
14	R5	Relay 5 Function	13 – Fan Temp. Control	
15	At	Power Failure Auto Restart Time	10	sec
16	ud	Offload Drain Interval Time	0 = off	sec
17	Sh	Starts Per Hour	0 = off	number
18	FH	Fan Temperature Control High - ON	85	°C
19	FL	Fan Temperature Control Low - OFF	75	°C
20	Ft	Fan Temperature Control Minimum Run Time	180	sec
P10				
21	Pr	Delivery Temperature Sensor Type	3 = KTY	

4.4.13 Reset To Defaults - PRESSURE TABLE

Factory Default			
No.	Item	Description	bar
P01			
1	Pu	Unload Pressure	7.0
2	Pl	Load Pressure	6.5
3	P>	Bar/psi/kPa Display Unit	0 = bar
P03			
4	Pd	Delivery Pressure Shutdown	8.0
P04			
5	Pd	Delivery Pressure Alarm	7.6
P05			
6	- -	Minimum Load Pressure Setting	5.0
7	- -	Delivery Pressure Shutdown Maximum	16.0
P10			
8	dr	Delivery Pressure Sensor Range	16.0

4.4.14 Temperature Sensor Adjustment Limits and Default Values

KTY Temperature °C	min	max	default	step
Alarm	70.0	131.0	110.0	0.5
Shutdown	71.0	132.0	120.0	0.5
Range	-10.0	132.0	-	-

PT100/1000 Temperature °C	min	max	default	step
Alarm	70.0	249.0	210.0	0.5
Shutdown Trip	71.0	250.0	220.0	0.5
Range	-50.0	250.0	-	-

RTD Temperature °C	min	max	default	step
Alarm	70.0	149.0	110.0	0.5
Shutdown	71.0	150.0	120.0	0.5
Range	-40.0	150.0	-	-

4.4.15 Pressure Control Source Priority Logic

Pressure regulation control can be derived from a number of sources, internal or remote. Each potential source has a different priority over other potential sources. The following source priority logic diagrams show the pressure regulation mode and method the controller will use under all potential setup selections, remote connection or failure mode conditions.

The remote digital load enable input (mode 16) has priority over all other pressure control sources.

If, for example, RS485 network control is selected as the primary source (8), and communications are disrupted, the controller will automatically select load/unload (2). When network communications are restored, the controller will automatically return to communications pressure regulation control (8).

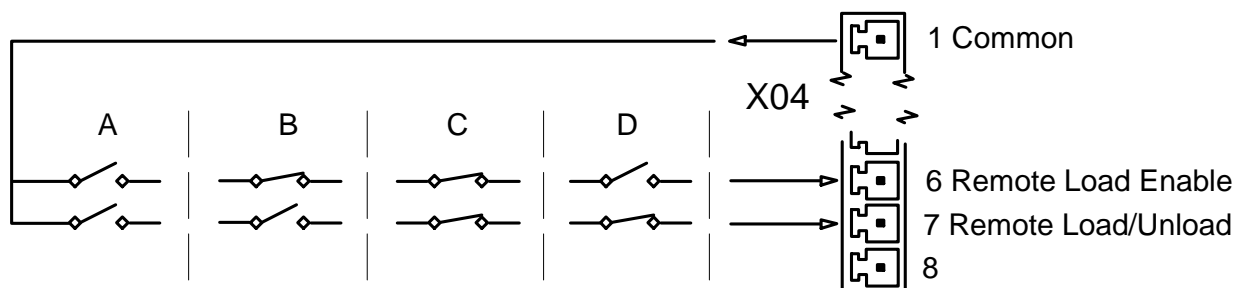
Safety:

Regardless of pressure regulation source, the set Alarm and Shutdown pressure safety limits remain active and are detected from the delivery pressure sensor. The delivery pressure sensor must never be detached from the air delivery point of the compressor package.

Alarm Limit Unload Override:

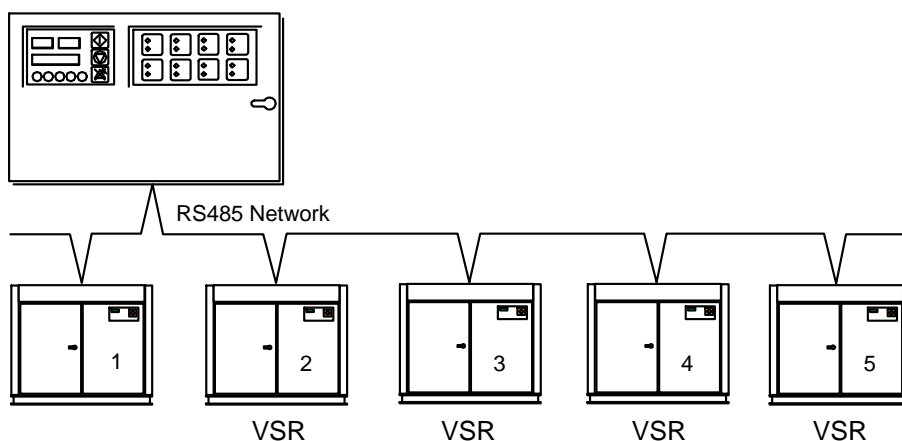
If delivery pressure exceeds the set Alarm pressure limit, regardless of pressure regulation source, the load solenoid will be immediately de-energized. The load solenoid will remain de-energized while pressure is above the set Alarm limit and for a period of 10 seconds after pressure falls below the Alarm limit. This is a safety feature designed to prevent incorrectly set remote pressure regulation sources causing the compressor to exceed design pressure limits. While in the Alarm Unload Override condition the pressure source number will be incremented by '1' (for example: remote digital load enable and load active (16) AND Alarm unload override active (1) = 17).

4.4.16 Remote Digital Load Input Functions:



- A Remote load enable not active
- B Remote load enable active, compressor unload command, PL & Pu ignored
- C Remote load enable active, compressor load command, PL & Pu ignored
- D Remote load enable not active, remote load input ignored

4.4.17 RS485 Communications Management Control System:



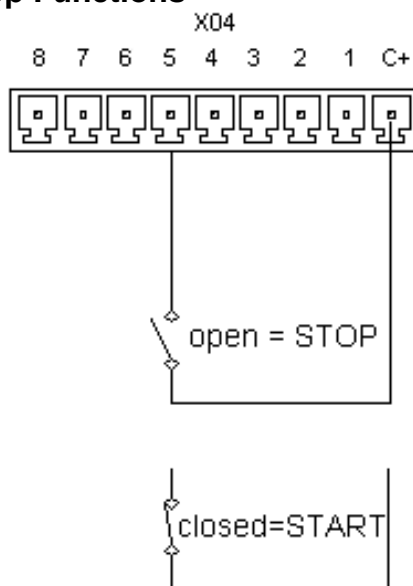
Integration with a CMC air system management controller is inherent to all standard S1 controllers.

More than one VSR (variable speed regulated) compressor can be sequence managed by a CMC air system management controller. One VSR compressor, selected depending on control strategy, will be assigned as top-up and will operate with full range speed regulation. Other VSR compressor(s), assigned as base-load units, will operate at the optimum speed set in each controller. If demand exceeds total system capacity at any time all base-load VSR compressors will increase speed above the optimum setting (up to the maximum speed setting) as appropriate to maintain pressure.

The CMC management control system is capable of demand matching any mixture of different output capacity VSR and fixed speed compressors in energy efficiency mode of operation.

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4.4.18 Remote Start Stop Functions



Connector type: 8 pole mini Combicon with 3.5mm pitch

Remote Start/Stop can be set in menu P07 item 05 to give value SS=2.

Pin	name	function	id	active state
01	C+	contact input common		
05	C5	Remote start / stop	digital input 5	stop if open / start on closure

Remote Stop:

When the remote start/stop function is enabled (P07), the compressor will execute a controlled stop, as if the control panel stop button had been pressed, when the remote start/stop input is open circuit.

Remote Start:

When the remote start/stop function is enabled (P07), the compressor will execute a normal start sequence when the remote start/stop input changes state from open to closed circuit. If closed, the remote start/stop input must be opened and closed again to initiate a remote start sequence. Local controller start is inhibited.

Menu P07

item#	description	units	step	min	max	default	display
5	start request source setting	0=keyboard 1=comm.req. 2=dig.inputs	1	0	2	0	SS 2

Set SS = 2 in menu P07

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5.0 Fault Messages

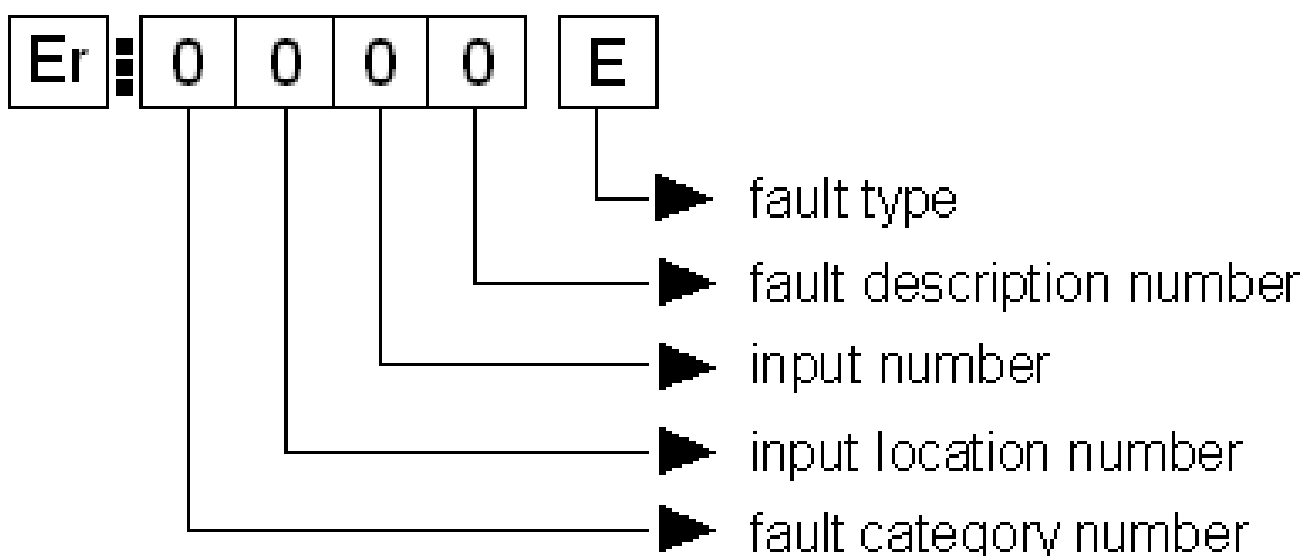
Faults are abnormal operating condition states. Alarms are fault states that indicate normal operating conditions have been exceeded but do not present an immediate hazard or potentially damaging condition. Alarms are intended as a warning only and will not stop the compressor or prevent the compressor from being started and run.

Start inhibits are fault states that prevent the compressor from initially being starting. Start inhibit faults are conditions that may present a hazard or damaging situation if the compressor was to be started. A start inhibits will self reset when the condition being monitored returns to normal operational levels. Start inhibit conditions are only checked during the initial start procedure and will not stop the compressor once started and in the 'started' state. Start inhibit conditions are not checked during an automated motor start from Standby.

Run inhibits are fault states that prevent the compressor from starting and running the main motor. Run inhibit faults are conditions that may present a hazard or damaging situation if the main motor is run. A run inhibit will self reset when the condition being monitored returns to normal operational levels and the compressor will then be allowed to exit the standby condition and run without further manual intervention. Run inhibit conditions are checked prior to a main motor start sequence and will not stop the compressor motor once started. Run inhibit conditions do not prevent the compressor from entering the 'started' state condition.

Shutdown trip errors are fault states that present a hazardous or damaging condition, the compressor is stopped immediately. The Shutdown trip error condition must be resolved, and the fault reset, before the compressor can be re-started.

The different fault state conditions are indicated on the screen with specific codes; the last character indicating the fault type: E = Shutdown Trip Error, A= Alarm, S = Start Inhibit, R = Run Inhibit. Shutdown trip errors are divided into two different categories: immediate shutdown errors and controlled stop errors. Immediate shutdown errors stop the compressor instantly (Emergency Stop button activated for example). Controlled stop errors stop the compressor in a controlled way using a normal Stop command; the motor will continue to run for the set stop run-on-time. Immediate shutdown errors have an error code where the first character is 0 (zero). Controlled stop faults have a "1" as the first character. Alarm faults are also divided into two different categories: alarms and service alarm messages. Alarms start with a "2", service alarm messages with a "4". Start Inhibit fault codes start with a "3".



Fault category number	Fault category description
0	immediate shutdown trip error
1	controlled shutdown trip error
2	alarm
3	start or run inhibit
4	service

Input location number	Input location description
0	digital input
1	analogue input
2 to 7	<i>not used</i>
8	special functions
9	special functions slave unit

Input number	Input
#	Input number for controller input terminal/location

Fault description number	Fault description
9	high level shutdown trip
8	high level alarm
7	high level start inhibit
6	special function
5	sensor error
4	timeout
3	low level start inhibit
2	low level alarm
1	low level shutdown trip
0	digital input

Fault type	Fault type description
E	shutdown trip error
A	alarm (or service message alarm)
S	start inhibit
R	run inhibit
L	load inhibit

5.1 Immediate Stop Shutdown Errors

5.1.1 Digital input errors

Er:0010 E emergency stop
Er:0020 E oil filter differential pressure switch or phase rotation relay
Er:0040 E air/oil separator differential pressure switch or phase rotation relay
Er:0080 E motor fault (fault relay contact, overload device contact or PTC thermistor)

5.1.2 Analogue input errors

Er:0115 E delivery pressure sensor fault
Er:0119 E delivery pressure high
Er:0125 E delivery temperature sensor fault
Er:0129 E delivery temperature high

5.1.3 Special function errors

Er:0821 E low resistance, short circuit or short circuit to earth condition exists on an digital input (incorrect connection, cable fault or sensor fault) X04
Er:0831 E low resistance, short circuit or short circuit to earth condition exists on an analogue input (incorrect connection, cable fault or sensor fault) X05
Er:0846 E Delivery pressure sensor range is set too low for default pressure settings to be applied.

5.2 Controlled Stop Shutdown Errors

none

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5.3 Alarms

5.3.1 Digital input alarms

Er:2030 A air filter differential pressure switch

5.3.2 Analogue input alarms

Er:2118 A delivery pressure high

Er:2128 A delivery temperature high

5.3.3 Special function alarms

Er:2816 A power failure occurred while compressor was in the Started state

5.4 Start Inhibits

none

5.5 Run Inhibits

Er:3123 R delivery temperature Td below the set low temperature run inhibit level, controller will allow motor start when temperature increases above the set level

5.6 Load Inhibits

Er: 3423 L If Td temperature below set TL 'Load Temperature' controller will display Er: 3423 L (load inhibit) warning and hold in offload state. Automatically reset, and compressor will load, when temperature exceeds the set TL temperature limit; cannot be manually reset.

5.7 Service Alarms

5.7.1 Special function service alarms

Er:4804 A General service hours time expired, service due (reset countdown timer)

Er:4814 A Air filter hour's time expired, service due (reset countdown timer)

Er:4824 A Oil filter hour's time expired, service due (reset countdown timer)

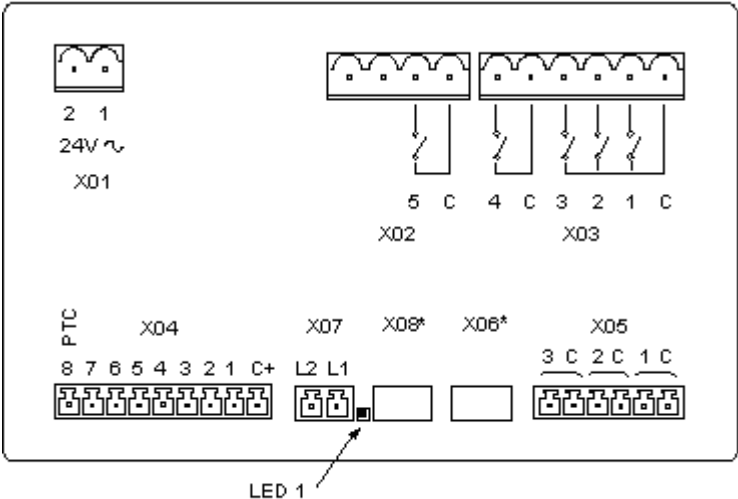
Er:4834 A Air/Oil Separator hours time expired, service due (reset countdown timer)

Er:4844 A Oil service hours time expired, service due (reset countdown timer)

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6.0 LED indication

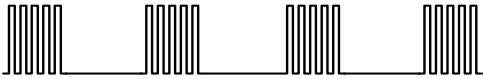
LED1 is located on the PCB between connectors X07 and X08 and can be seen from the rear of the controller without removing the rear enclosure housing. This LED gives diagnostic information about different functions of the S1 controller.



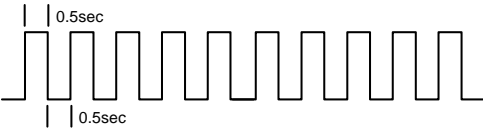
Production; Burn-in



Production; Test Mode

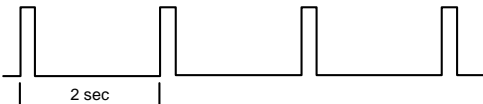


Normal Operating Mode
No Communications

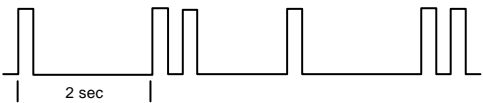


Note: a two second interruption to this sequence will occur every 10 second as the S1 broadcasts output data on the RS485 communications port.

Normal Operating Mode
RS485#1 Communications

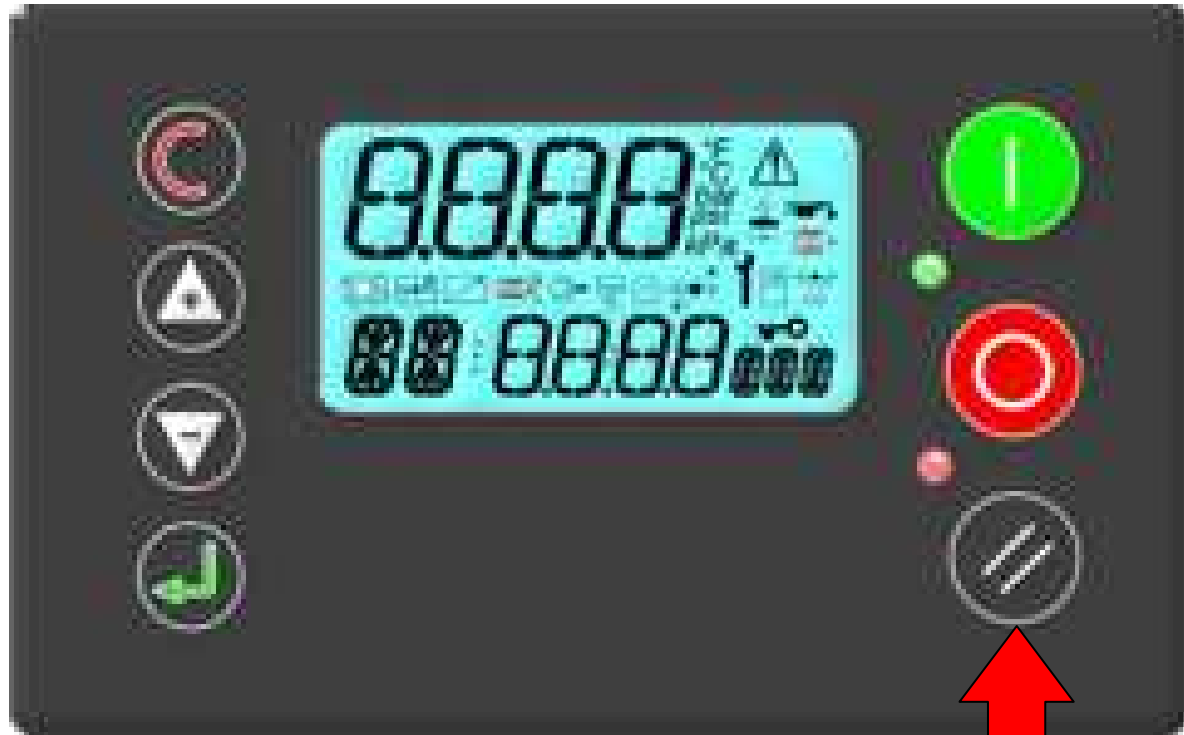


Normal Operating Mode
RS485#1



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7.0 SERVICE Function

**“RESET”**

- By pressing the reset button for 5 sec when started and running, the compressor will go in a forced unloaded status and the controller does not take into account the run on timer “Rt” (the same as the continuous mode but with extra unload forcing)
- By pressing the reset button (shortly) again or a stop request, or no longer being started the compressor is going back to normal mode.